VIBRO CHAMP® XD

(This is the model name for warranty claims)

p/n 2331000000 (120V)

SERVICE MANUAL

ATTENTION:

WARRANTY SERVICE PROCEDURES

Warranty field service except for tube replacement is not allowed on the Vibro Champ® XD Amplifier **(See Service Bulletin #SB07-1)**. Any Dealer or Service Center in possession of a defective Vibro Champ® XD with a warrantable defect other than failed tubes, should contact the Fender Customer Service Support Center to arrange for a replacement amplifier. The Support Center can be reached at (800) 345-3642 or by email at service@fender.com.

THIS TECHNICAL DATA PROVIDED FOR NON-WARRANTY REPAIRS ONLY

Fender Musical Instruments Corporation, 8860 East Chaparral Road Suite 100 Scottsdale, AZ 85250
Issued: October, 2006

VIBRO CHAMP® XD

(This is the model name for warranty claims)

January, 2007

IMPORTANT NOTICE

- Parts marked with two asterisks (**) indicate the required use of that specific part. This is necessary for RELIABILITY and SAFETY requirements. **DO NOT USE A SUBSTITUTE!**

PARTS LIST CODES

The description codes used in the itemized Parts Lists are defined below:

CAPACITOR CODES

CAP AE	=	Aluminum Electrolytic
CAP CA	=	Ceramic Axial
CAP CD	=	Ceramic Disk
CAP CR	=	Ceramic Radial
CAP MPF	=	Metalized Polyester Film
CAP MY	=	Mylar
CAP PFF	=	Polyester Film/Foil

RESISTOR CODES

RES CC	=	Carbon Comp
RES CF	=	Carbon Film
RES FP	=	Flame Proof
RES MF	=	Metal Film
RES MOX	=	Metal Oxide
RES WW	=	Wire Wound

HARDWARE CODES

BLX	=	Black Oxide
CR	=	Chrome Plated
HWH	=	Hex Washer Head
M	=	Machine Screw
NI	=	Nickel Plated
OHP	=	Oval Head Phillips
PB	=	Particle Board
PHP	=	Pan Head Phillips
PHPS	=	Pan Head Phillips Sems
SMA	=	Sheet Metal "A" Point
SMB	=	Sheet Metal "B" Point
SS	=	Stainless Steel
TF	=	Thread Forming
ZI	=	Zinc Plated

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SPECIFICATIONS

Model Name:		**VIBRO CHAMP XD**
Release Number:		PR 736
Part Numbers	**(120V, 60Hz) US:**	2331000000
	(240V, 50Hz) AUS:	2331003900
	(230V, 50Hz) UK:	2331004900
	(230V, 50Hz) EUR:	2331006900
	(100V, 50Hz) JPN:	2331007900
Power Requirement:		45 W
Power Output:		5 W RMS into 4 ohms @ 10 %THD
Power Amp Sensitivity:		TBDmV for 5 W into 4 ohms @ 5 %THD
Impedances	**Input (Pre-Amp):**	>1M Ohms
	Line Out:	1 kOhm
Speaker Complement:		Fender Special Design, 4 ohm, 8” 0073857000
Dimensions	**Height:**	14.0 in (35.5 cm)
	Width:	17.0 in (43.2 cm)
	Depth:	8.65 in (22 cm)
Weight:		23 lbs (10.4 kg)

Product specifications are subject to change without notice

SERVICE NOTES

1. **CHASSIS REMOVAL** is accomplished by first removing the cabinet's upper back panel. Then remove the four (4) screws from the top of the cabinet that secure the chassis. Disconnect the ¼" speaker plug from the speaker jack. Then slide the chassis toward the rear of the cabinet.

2. **MAIN PCB REMOVAL** is accomplished by removing the IEC Connector, the fuse holder, the speaker jack nut, the line out jack nut and the two screws that hold the chassis' rear panel to the chassis. Remove the rear panel and the vacuum tubes. Disconnect the ribbon cable that goes between the main PCB and the uDSP PCB. Remove all screws holding the main PCB to the stand offs on the chassis. Then remove the front panel knobs and the nuts holding the controls to the front panel. Slide the front panel PCB back away from the front panel. Remove all the fast-ons connecting the main PCB to the power indicator, the power transformer and the output transformer. Now the main PCB can be lifted up and out of the chassis taking advantage of the slots in the back of the chassis.

PCB EXCHANGE POLICY

Parts marked with a single asterisk (*) in the Part Lists are not field replaceable. If a failure due to one of these components is detected, please contact the FMIC Customer Service Department to order the complete PCB Assembly.

CIRCUIT DESCRIPTION

This section provides concise information about new or unusual circuitry designs incorporated into this amplifier model. The purpose is to aid the service technician by providing insight into the design areas most likely to become obstacles in troubleshooting. Information is focused for its effective use while maintaining the security of Fender® proprietary information wherever possible.

MAIN PCB

The main PCB contains the circuitry for the preamplifier, the power amplifier and the power supply. The controls are located on a breakaway section of the main PCB with ribbon cables connecting them.

PRE-AMPLIFIER

Op-amp U8-A provides the high impedance instrument input with 15db of gain. Op-amp U8-B is configured as a three pole active filter. The filtered output signal (Lin) drives the encoder portion of the CODEC U13 of the uDSP PCB. Signal VQ2 is the D.C. reference voltage from the CODEC thus centering the output signal about this level. Op-amp U3-A is configured as a differential input amp recovering the signal after uDSP processing and conversion back to an analog signal in the decoder portion of the CODEC U13. The LOUT+ and LOUT- signals are the input to the differential amp which acts as a three pole active low pass filter. The output of U3-A is applied to a unity gain buffer amp U1-A which drives op-amp U1-B which provides the LINE OUT signal. FET Q1 provides system muting during power up/down in conjunction with the power sense circuits comprised of D10, Q2 and Q4.

USER INTERFACE

The 4 - 16 position encoders (S1 –S2) for the VOICE and EFFECT SELECT are read via the port expander U4 and the data sent to the uDSP system via the I^2C interface lines SCL and SDA.

The 5 potentiometers VOLUME (R69), GAIN (R70), TREBLE (R68), BASS (R67) and FX LEVEL (R66) generate DC voltages (+1.0V to +4.0V) that are read by the analog multiplexer U5. Lines IO0 - IO3 are the digital control lines used to multiplex these analog signals which are sent serially to the system CODEC U13 on the Rin channel. The uDSP system reads the state of these controls and inputs digitally from the CODEC.

POWER AMPLIFIER

The power amplifier consists of V1, V2, T2 and associated circuitry. The signal is fed to the gate of V1 in common cathode configuration. The signal is then fed from the plate of V1 to the gate of V2 which is operating in Class 'A'. T2 matches the impedance of V2's plate to the 4 Ohm speaker. Negative feedback is provided by R5 feeding signal back to V1's cathode.

uDSP PCB

The uDSP PCB is located in the back of the chassis opposite the power transformer. It provides the amplifier voicing and effects functions. **The uDSP PCB is not field serviceable** and must be replaced as an assembly.

POWER SUPPLY

T1 has four secondary windings for the +5V regulator, the +/-12V supplies, the tube filaments and the high voltage supply. The violet winding is rectified by a full wave bridge, filtered by C41 and fed to a three terminal regulator to produce 5VDC for the digital circuitry on the main PCB and fed to the uDSP PCB where it is regulated to +3.3.VDC and fed back on to the main PCB. Similarly, the center tapped orange and yellow winding is rectified, filtered and fed to +/-12V zeners to provide power to the operational amplifiers and other circuitry. The red windings provide the high voltage for the vacuum tubes. The green winding provides 6.3VAC for the vacuum tube filaments.

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VIBRO CHAMP® XD

(This is the model name for warranty claims)

.PARTS LIST:	**MAIN PCB ASSEMBLY**		
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
4	0050687000	CABLE JMPR 6 CKT .156 ROUND	PW1A PW1B PW2A PW2B
2	0051410000	CABLE RIBBON 8 CKT 16"	PW3A PW3B
4	0038692001	CAP AE AX 10uF 35V 20%	C24 C40 C49-50
3	0038690001	CAP AE AX 1uF 100V 20%	C11 C25 C48
1	0009512001	CAP AE AX 22uF 25V 20%	C3
2	0028494000	CAP AE RDL 1000uF 35V 20%	C52 C55
4	0054204000	CAP AE RDL 22uF 450V 20% 85'C	C4 C14 C19 C28
1	0055992000	CAP AE RDL 4700uF 16V 20% 85'C	C41
2	0028471003	CAP AE RDL 47uF 50V 20%	C54 C57
1	0039270001	CAP CA .01uF 50V	C2
1	0039263001	CAP CA 1000pF 50V LL	C13
2	0039259001	CAP CA 220pF 100V LL	C1 C56
1	0039267001	CAP CA 3900pF 100V	C15
2	0051457003	CAP CD 100pF 500V 5%	C7 C12
3	0051406003	CAP CD 220pF 500V 10%	C22-23 C27
2	0051458003	CAP CD 470pF 500V 10%	C18 C47
16	0034788003	CAP CR .1uF 50V 20% .2" LS	C9-10 C16-17 C20-21 C26 C33 C37-39 C43-46 C51
1	0027255003	CAP MPF .001uF 100V 10%	C6
1	0027270003	CAP MPF .033uF 100V 10%	C34
1	0053860000	**CAP MPF .1uF 250VAC 20%	C53
2	0027278003	CAP MPF .1uF 63V 10%	C35 C58
1	0024833000	CAP MPF RDL .022uF 400V 10%	C8
1	0024855000	CAP MPF RDL .1uF 630V 10%	C5
6	0033578003	CAP PFF RDL .001uF 100V 10%	C29-32 C36 C42
5	0027941000	CONTROL SNAPIN 50k B TAPER	R66-70
8	0064089001	DIODE 1N4003	D11-14, D23-25, D28
4	0026730001	DIODE 1N4006 800V 1A	D2 D6-8
13	006260001	DIODE 1N4448 SIGNAL LL	D1 D3-5 D9 D15-22
1	0027327001	DIODE ZEN 1N5234B 6.2V 5% LL	D10
2	0047140060	DIODE ZEN 1N5349B 12V 5W 5%	D26-27
2	0063204000	ENCODER 16-POS 4-BIT GRAY CODE	S1-2
7	0026000001	FSTN TAB MALE .187x.032 PCB MT	J3-6 P2-3 P11
10	0025802000	FSTN TAB MALE .250x.032 PCB MT	P4-10 P12-14
2	0073586000	FUSE PICO 1A	F3-4
1	0075607000	FUSE PICO 2A	F2
1	0070334001	FUSE PICO 7 AMP 125V	F1
1	0057191000	HDR .1 CTR 10x2 CKT SQ PIN	P1
1	0028128000	IC 4051B SINGLE 8 CHANNEL SWITCH	U5
1	0071001000	IC 8-BIT I/O EXPANDER MCP23008	U4
3	0031611000	IC OP-AMP DUAL PC4560	U1-2 U9
3	0016795000	IC OP-AMP DUAL TL072	U3 U8 U10
1	0041812000	IC REGULATOR +5V MC7805CT	U7
1	0073348000	IC SMT RESET 5V MC34064D-5	U6
1	0053450000	JACK STEREO R/A	J1

***** Non-serviceable part. Replace complete parent assembly. See PCB EXCHANGE POLICY section above.

shaded Unique Fender® part. Order directly from the FMIC Parts Department.

shaded + ***** Access to this part or assembly is controlled. Please contact the FMIC Customer Service Department.

****** Safety Requirement part. Replacement must match Safety Agency…–*Value,* if specified –*Type,* if specified –*Approval Mark(s)* if on part.

shaded + ****** Both a unique Fender® part and a Safety Requirement part as defined above.

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.PARTS LIST: **MAIN PCB ASSEMBLY**			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
2	0059889000	JACK STEREO R/A w/METAL BUSH	J2 J7
1	REF	Jumper	JMP1
1	REF	Jumper	JMP2
1	0037169001	RES CF 1/2W 5% 1.8k LL	R65
1	0025116001	RES CF 1/2W 5% 100k LL	R6
1	0025117001	RES CF 1/2W 5% 220k LL	R21
3	0024969001	RES CF 1/4W 5% 1.5k LL	R3 R10 R29
2	0024997001	RES CF 1/4W 5% 100k LL	R20 R32
4	0024952001	RES CF 1/4W 5% 100ohm LL	R11-12 R50-51
1	0025084001	RES CF 1/4W 5% 10M LL	R26
6	0024981001	RES CF 1/4W 5% 10k LL	R14-15 R27 R40-41 R44
1	0029598001	RES CF 1/4W 5% 110ohm LL	R36
4	0024983001	RES CF 1/4W 5% 12k LL	R22-25
2	0025069001	RES CF 1/4W 5% 1M LL	R28 R42
5	0024965001	RES CF 1/4W 5% 1k LL	R2 R57-59 R75
1	0024971001	RES CF 1/4W 5% 2.2k LL	R5
2	0029006001	RES CF 1/4W 5% 20k LL	R18-19
1	0024956001	RES CF 1/4W 5% 220ohm LL	R30
1	0024987001	RES CF 1/4W 5% 22k LL	R13
1	0024942001	RES CF 1/4W 5% 22ohm LL	R64
1	0024988001	RES CF 1/4W 5% 27k LL	R35
1	0029005001	RES CF 1/4W 5% 2k LL	R43
3	0024975001	RES CF 1/4W 5% 3.9k LL	R16 R33 R46
2	0024977001	RES CF 1/4W 5% 4.7k LL	R1 R49
7	0024993001	RES CF 1/4W 5% 47k LL	R37-39 R54-56 R63
3	0024947001	RES CF 1/4W 5% 47ohm LL	R4 R52-53
1	0029607001	RES CF 1/4W 5% 620ohm LL	R47
1	0029608001	RES CF 1/4W 5% 750ohm LL	R45
1	0024996001	RES CF 1/4W 5% 82k LL	R17
2	0029597001	RES CF 1/4W 5% 91ohm LL	R31 R48
1	0016540001	RES MF 1/4W 1% 2.61k LL	R61
2	0016946001	RES MF 1/4W 1% 825ohm LL	R60 R62
1	0054213001	RES MOX 2W 5% 100k LL	R74
2	0036351001	RES MOX 2W 5% 100ohm LL	R71-72
1	0041268001	RES MOX 2W 5% 10k LL	R7
2	0041405001	RES MOX 2W 5% 22k LL	R8 R73
2	0028021001	RES MOX 2W 5% 470ohm LL	R9 R34
1	0994020001	TUBE 6V6GTA STR391A	V2
1	0994024000	TUBE 7025/12AX7A (CHINESE)	V1
4	REF	Wire Jumper	WJ3A WJ3B WJ4A WJ4B
2	REF	Wire Jumper	WJ2A WJ2B
1	REF	Wire Solder Point, 18GA	WJ8
1	REF	Wire Solder Point, 18GA	WJ1
1	0014689003	XSTR N-CH JFET J111 TO-92	Q1

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.PARTS LIST: **MAIN PCB ASSEMBLY**			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0016739003	XSTR NPN 2N4401 TO-92	Q2
1	0016742003	XSTR PNP 2N4403 TO-92	Q3

.PARTS LIST: **MISCELLANOUS**			
QTY.	PART #	DESCRIPTION	REFERENCE DESIGNATION
1	0036702000	**FUSE CARRIER	
1	0054642000	**IEC CONNECTOR	
1	0054798000	POWER JEWEL RED	
1	0055812000	TULIP LED ASSY	
1	0022905000	**TRANSFORMER OUTPUT CLASS A 5W	T2
1	0039287000	**SWITCH POWER	
1	0074592000	**XFMR PWR CHAMP XD AMPS 120V	T1
1	0074595000	**XFMR PWR CHAMP XD AMPS 100V	T1
1	0074596000	**XFMR PWR CHAMP XD AMPS 230V	T1
1	0074597000	**XFMR PWR CHAMP XD AMPS 240V	T1
1	0077982000	**FUSE 1 ¼ X ¼ 3A FAST ACTING	F2 (100/120V UNITS)
1	0020793000	**FUSE 5mmX20MM 1.6A FAST ACTING	F2(230/240V UNITS)
2	0057347000	KNOB ROTARY W/CHROME INSERT	FX SELECT/VOICE
5	0054419000	KNOB ROTARY W/CHROME INSERT	VOLUME/TONE
1	0073857000	SPEAKER 8" VIBRO CHAMP XD	
1	0074593000	*PCB ASSY uDSP VIBROCHAMP	

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Service Diagram List

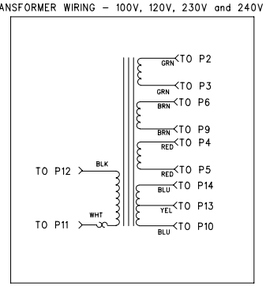
Service Diagram (Schematic) .....VIBRO CHAMP XD

Service Diagram (PCB Assembly) .....VIBRO CHAMP XD

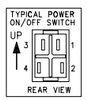
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	PR 736	13-JUN-07	LEL

F2 FUSE USAGE TABLE		
100V	120V	220V – 240V
3.0A FAST 250V	3.0A FAST 250V	1.6A FAST 250V

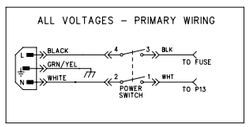
TRANSFORMER WIRING – 100V, 120V, 230V and 240V



TYPICAL POWER ON/OFF SWITCH



ALL VOLTAGES – PRIMARY WIRING



7. LAST REFERENCE DESIGNATOR: C58, D28, F4, J7, JMP2, P14, PW1A, PW1B, PW2A, PW2B, PW3A, PW3B, Q3, R75, S2, U10, V2. WJ1, WJ2A, WJ2B, WJ3A, WJ3B, WJ4A, WJ4B, WJ8.
6. AC AND DC VOLTAGES ARE +/–20% RELATIVE TO GROUND WITH A DVM UNDER THE FOLLOWING CONDITIONS:
   UNIT AT RATED LINE VOLTAGE
   4 OHM RESISTIVE LOAD CONNECTED TO J2
   FX LEVEL CONTROL AT FULL CCW, VOLUME CONTROL AT "5 1/2"
   JACK INSERTED AT J7, VOICE KNOB SET to 4
   NO INPUT SIGNAL (TP1–TP15, TP2X)
   ADDITIONAL CONDITIONS (TP16–TP25):
   50mV 1kHz SINEWAVE INPUT TO J7
5. THIS SCHEMATIC IS FOR PCB FABRICATION P/N 736CKW004 AND PCB ASSEMBLY P/N 736CKW007.
4. ALL DIODES ARE IN4448 UNLESS OTHERWISE NOTED.
3. ALL POLARIZED CAPACITORS IN uF, 20%, 50V MINIMUM.
2. ALL UNPOLARIZED CAPACITORS IN uF, 10% OR BETTER; 50V MINIMUM. (POWER SUPPLY BYPASS CAPACITORS ARE 20%).
1. ALL RESISTORS IN OHMS, 5%; 1/4W.

NOTES: (UNLESS OTHERWISE NOTED)

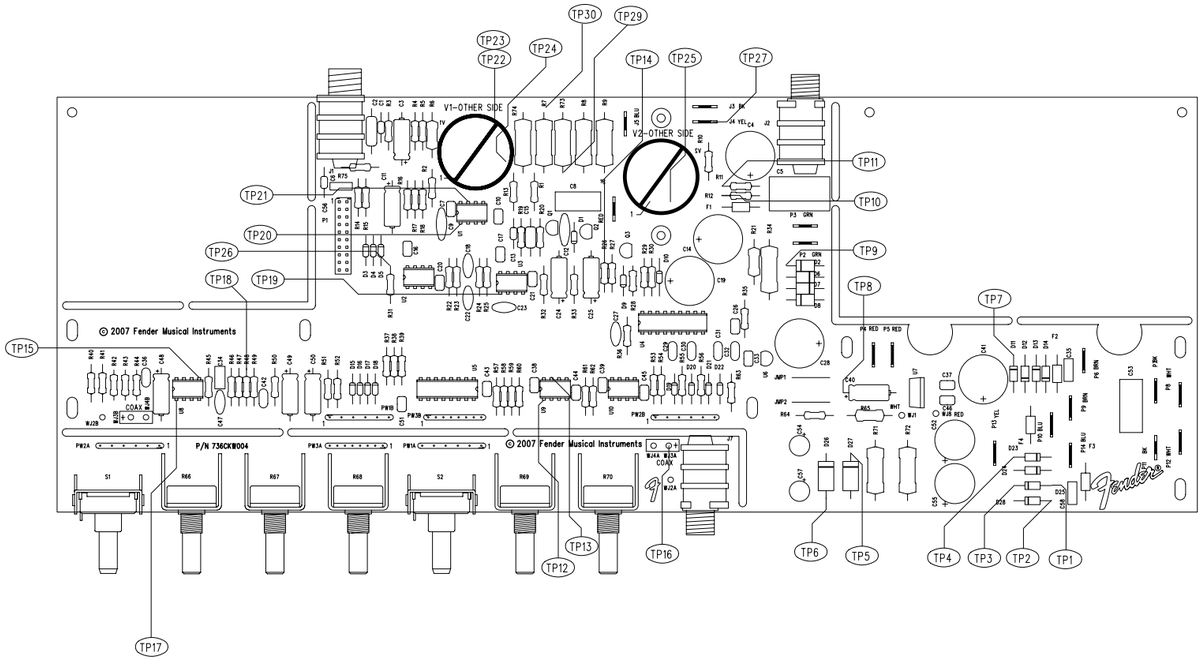
CHECKED BY: _____
DATE: _____
APPROVED BY: _____
DATE: _____
DRAWN: LORENZEN | ENGR: LORENZEN
DATABASE FILE: Z736S.SCH

FENDER MUSICAL INSTRUMENTS
Corona, CA USA

TITLE: SERVICE DIAGRAM, COMBINED (schematic)
VIBRO CHAMP XD

SIZE D | DRAWING NUMBER 736CKW003 | REV. A
RELEASE DATE: 13-JUN-07 | SHEET: 1 OF 2

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	PR736	13-JUN-07	L E L



FILM/DWG:	SERVICE DIAGRAM
DATABASE: Z736P.PCB	DATE: 13-JUN-07

NOTES: (UNLESS OTHERWISE NOTED)

CHECKED BY: _____ DATE: _____

APPROVED BY: _____ DATE: _____

DRAWN: HAN LE | ENGR: LORENZEN

DATABASE FILE: Z736P.PCB

Fender® MUSICAL INSTRUMENTS
Corona, CA U.S.A.

TITLE: SERVICE DIAGRAM, COMBINED (PCB assy)
VIBRO CHAMP XD

SIZE	DRAWING NUMBER	REV.
D	736CKW003	A

RELEASE DATE: 13-JUN-07 | SHEET 2 OF 2